

## SEQUENCE LISTING

<110> CONTORNI, Mario

<120> LIQUID VACCINES FOR MULTIPLE MENINGOCOCCAL SEROGROUPS

<130> PP021401.0012

<140> 10/574,424

<141> 2004-10-04

<150> GB0323102.4

<151> 2003-10-02

<150> GB0412052.3

<151> 2004-05-28

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<170> SeqWin99, version 1.02

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<211> 350

<212> PRT

<213> N. meningitidis

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Ala Ala Thr Val Ala Ile Ala Ala Ala Tyr Asn Asn Gly Gln Glu Ile  
35 40 45

Asn Gly Phe Lys Ala Gly Glu Thr Ile Tyr Asp Ile Asp Glu Asp Gly  
50 55 60

Thr Ile Thr Lys Lys Asp Ala Thr Ala Ala Asp Val Glu Ala Asp Asp  
65 70 75 80

Phe Lys Gly Leu Gly Leu Lys Lys Val Val Thr Asn Leu Thr Lys Thr  
85 90 95

Val Asn Glu Asn Lys Gln Asn Val Asp Ala Lys Val Lys Ala Ala Glu  
100 105 110

Ser Glu Ile Glu Lys Leu Thr Thr Lys Leu Ala Asp Thr Asp Ala Ala  
115 120 125

Leu Ala Asp Thr Asp Ala Ala Leu Asp Ala Thr Thr Asn Ala Leu Asn  
130 135 140

Lys Leu Gly Glu Asn Ile Thr Thr Phe Ala Glu Glu Thr Lys Thr Asn  
145 150 155 160

Ile Val Lys Ile Asp Glu Lys Leu Glu Ala Val Ala Asp Thr Val Asp  
165 170 175

Lys His Ala Glu Ala Phe Asn Asp Ile Ala Asp Ser Leu Asp Glu Thr  
 180 185 190  
 Asn Thr Lys Ala Asp Glu Ala Val Lys Thr Ala Asn Glu Ala Lys Gln  
 195 200 205  
 Thr Ala Glu Glu Thr Lys Gln Asn Val Asp Ala Lys Val Lys Ala Ala  
 210 215 220  
 Glu Thr Ala Ala Gly Lys Ala Glu Ala Ala Ala Gly Thr Ala Asn Thr  
 225 230 235 240  
 Ala Ala Asp Lys Ala Glu Ala Val Ala Ala Lys Val Thr Asp Ile Lys  
 245 250 255  
 Ala Asp Ile Ala Thr Asn Lys Asp Asn Ile Ala Lys Lys Ala Asn Ser  
 260 265 270  
 Ala Asp Val Tyr Thr Arg Glu Glu Ser Asp Ser Lys Phe Val Arg Ile  
 275 280 285  
 Asp Gly Leu Asn Ala Thr Thr Glu Lys Leu Asp Thr Arg Leu Ala Ser  
 290 295 300  
 Ala Glu Lys Ser Ile Ala Asp His Asp Thr Arg Leu Asn Gly Leu Asp  
 305 310 315 320  
 Lys Thr Val Ser Asp Leu Arg Lys Glu Thr Arg Gln Gly Leu Ala Glu  
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 Thr Ile Tyr Asp Ile Asp Glu Asp Gly Thr Ile Thr Lys Lys Asp Ala  
 35 40 45  
 Thr Ala Ala Asp Val Glu Ala Asp Asp Phe Lys Gly Leu Gly Leu Lys  
 50 55 60  
 Lys Val Val Thr Asn Leu Thr Lys Thr Val Asn Glu Asn Lys Gln Asn  
 65 70 75 80  
 Val Asp Ala Lys Val Lys Ala Ala Glu Ser Glu Ile Glu Lys Leu Thr  
 85 90 95  
 Thr Lys Leu Ala Asp Thr Asp Ala Ala Leu Ala Asp Thr Asp Ala Ala  
 100 105 110

Leu Asp Ala Thr Thr Asn Ala Leu Asn Lys Leu Gly Glu Asn Ile Thr  
 115 120 125  
 Thr Phe Ala Glu Glu Thr Lys Thr Asn Ile Val Lys Ile Asp Glu Lys  
 130 135 140  
 Leu Glu Ala Val Ala Asp Thr Val Asp Lys His Ala Glu Ala Phe Asn  
 145 150 155 160  
 Asp Ile Ala Asp Ser Leu Asp Glu Thr Asn Thr Lys Ala Asp Glu Ala  
 165 170 175  
 Val Lys Thr Ala Asn Glu Ala Lys Gln Thr Ala Glu Glu Thr Lys Gln  
 180 185 190  
 Asn Val Asp Ala Lys Val Lys Ala Ala Glu Thr Ala Ala Gly Lys Ala  
 195 200 205  
 Glu Ala Ala Ala Gly Thr Ala Asn Thr Ala Ala Asp Lys Ala Glu Ala  
 210 215 220  
 Val Ala Ala Lys Val Thr Asp Ile Lys Ala Asp Ile Ala Thr Asn Lys  
 225 230 235 240  
 Asp Asn Ile Ala Lys Lys Ala Asn Ser Ala Asp Val Tyr Thr Arg Glu  
 245 250 255  
 Glu Ser Asp Ser Lys Phe Val Arg Ile Asp Gly Leu Asn Ala Thr Thr  
 260 265 270  
 Glu Lys Leu Asp Thr Arg Leu Ala Ser Ala Glu Lys Ser Ile Ala Asp  
 275 280 285  
 His Asp Thr Arg Leu Asn Gly Leu Asp Lys Thr Val Ser Asp Leu Arg  
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 Phe Gln Pro Tyr Asn Val Gly  
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 <213> N. meningitidis

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 Val Arg Lys Asn Glu Lys Leu Lys Leu Ala Ala Gln Gly Ala Glu Lys  
 35 40 45  
 Thr Tyr Gly Asn Gly Asp Ser Leu Asn Thr Gly Lys Leu Lys Asn Asp  
 50 55 60

Lys Val Ser Arg Phe Asp Phe Ile Arg Gln Ile Glu Val Asp Gly Gln  
 65 70 75 80  
 Leu Ile Thr Leu Glu Ser Gly Glu Phe Gln Val Tyr Lys Gln Ser His  
 85 90 95  
 Ser Ala Leu Thr Ala Phe Gln Thr Glu Gln Ile Gln Asp Ser Glu His  
 100 105 110  
 Ser Gly Lys Met Val Ala Lys Arg Gln Phe Arg Ile Gly Asp Ile Ala  
 115 120 125  
 Gly Glu His Thr Ser Phe Asp Lys Leu Pro Glu Gly Gly Arg Ala Thr  
 130 135 140  
 Tyr Arg Gly Thr Ala Phe Gly Ser Asp Asp Ala Gly Gly Lys Leu Thr  
 145 150 155 160  
 Tyr Thr Ile Asp Phe Ala Ala Lys Gln Gly Asn Gly Lys Ile Glu His  
 165 170 175  
 Leu Lys Ser Pro Glu Leu Asn Val Asp Leu Ala Ala Ala Asp Ile Lys  
 180 185 190  
 Pro Asp Gly Lys Arg His Ala Val Ile Ser Gly Ser Val Leu Tyr Asn  
 195 200 205  
 Gln Ala Glu Lys Gly Ser Tyr Ser Leu Gly Ile Phe Gly Gly Lys Ala  
 210 215 220  
 Gln Glu Val Ala Gly Ser Ala Glu Val Lys Thr Val Asn Gly Ile Arg  
 225 230 235 240  
 His Ile Gly Leu Ala Ala Lys Gln  
 245

<210> 4  
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 <212> PRT  
 <213> N. meningitidis

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 35 40 45  
 Lys Gly Tyr Thr Pro Gln Ile Ser Val Val Gly Tyr Asn Arg His Leu  
 50 55 60  
 Leu Leu Leu Gly Gln Val Ala Thr Glu Gly Glu Lys Gln Phe Val Gly  
 65 70 75 80  
 Gln Ile Ala Arg Ser Glu Gln Ala Ala Glu Gly Val Tyr Asn Tyr Ile  
 85 90 95

Thr Val Ala Ser Leu Pro Arg Thr Ala Gly Asp Ile Ala Gly Asp Thr  
 100 105 110

Trp Asn Thr Ser Lys Val Arg Ala Thr Leu Leu Gly Ile Ser Pro Ala  
 115 120 125

Thr Gln Ala Arg Val Lys Ile Val Thr Tyr Gly Asn Val Thr Tyr Val  
 130 135 140

Met Gly Ile Leu Thr Pro Glu Glu Gln Ala Gln Ile Thr Gln Lys Val  
 145 150 155 160

Ser Thr Thr Val Gly Val Gln Lys Val Ile Thr Leu Tyr Gln Asn Tyr  
 165 170 175

Val Gln Arg

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 <211> 168  
 <212> PRT  
 <213> N. meningitidis

<400> 5  
 Ala Thr Tyr Lys Val Asp Glu Tyr His Ala Asn Ala Arg Phe Ala Ile  
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Asp His Phe Asn Thr Ser Thr Asn Val Gly Gly Phe Tyr Gly Leu Thr  
 20 25 30

Gly Ser Val Glu Phe Asp Gln Ala Lys Arg Asp Gly Lys Ile Asp Ile  
 35 40 45

Thr Ile Pro Ile Ala Asn Leu Gln Ser Gly Ser Gln His Phe Thr Asp  
 50 55 60

His Leu Lys Ser Ala Asp Ile Phe Asp Ala Ala Gln Tyr Pro Asp Ile  
 65 70 75 80

Arg Phe Val Ser Thr Lys Phe Asn Phe Asn Gly Lys Lys Leu Val Ser  
 85 90 95

Val Asp Gly Asn Leu Thr Met His Gly Lys Thr Ala Pro Val Lys Leu  
 100 105 110

Lys Ala Glu Lys Phe Asn Cys Tyr Gln Ser Pro Met Glu Lys Thr Glu  
 115 120 125

Val Cys Gly Gly Asp Phe Ser Thr Thr Ile Asp Arg Thr Lys Trp Gly  
 130 135 140

Met Asp Tyr Leu Val Asn Val Gly Met Thr Lys Ser Val Arg Ile Asp  
 145 150 155 160

Ile Gln Ile Glu Ala Ala Lys Gln  
 165

<210> 6  
 <211> 464  
 <212> PRT  
 <213> N. meningitidis

<400> 6  
 Ser Pro Asp Val Lys Ser Ala Asp Thr Leu Ser Lys Pro Ala Ala Pro  
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 Val Val Ser Glu Lys Glu Thr Glu Ala Lys Glu Asp Ala Pro Gln Ala  
 20 25 30  
 Gly Ser Gln Gly Gln Gly Ala Pro Ser Ala Gln Gly Ser Gln Asp Met  
 35 40 45  
 Ala Ala Val Ser Glu Glu Asn Thr Gly Asn Gly Gly Ala Val Thr Ala  
 50 55 60  
 Asp Asn Pro Lys Asn Glu Asp Glu Val Ala Gln Asn Asp Met Pro Gln  
 65 70 75 80  
 Asn Ala Ala Gly Thr Asp Ser Ser Thr Pro Asn His Thr Pro Asp Pro  
 85 90 95  
 Asn Met Leu Ala Gly Asn Met Glu Asn Gln Ala Thr Asp Ala Gly Glu  
 100 105 110  
 Ser Ser Gln Pro Ala Asn Gln Pro Asp Met Ala Asn Ala Ala Asp Gly  
 115 120 125  
 Met Gln Gly Asp Asp Pro Ser Ala Gly Gly Gln Asn Ala Gly Asn Thr  
 130 135 140  
 Ala Ala Gln Gly Ala Asn Gln Ala Gly Asn Asn Gln Ala Ala Gly Ser  
 145 150 155 160  
 Ser Asp Pro Ile Pro Ala Ser Asn Pro Ala Pro Ala Asn Gly Gly Ser  
 165 170 175  
 Asn Phe Gly Arg Val Asp Leu Ala Asn Gly Val Leu Ile Asp Gly Pro  
 180 185 190  
 Ser Gln Asn Ile Thr Leu Thr His Cys Lys Gly Asp Ser Cys Ser Gly  
 195 200 205  
 Asn Asn Phe Leu Asp Glu Glu Val Gln Leu Lys Ser Glu Phe Glu Lys  
 210 215 220  
 Leu Ser Asp Ala Asp Lys Ile Ser Asn Tyr Lys Lys Asp Gly Lys Asn  
 225 230 235 240  
 Asp Lys Phe Val Gly Leu Val Ala Asp Ser Val Gln Met Lys Gly Ile  
 245 250 255  
 Asn Gln Tyr Ile Ile Phe Tyr Lys Pro Lys Pro Thr Ser Phe Ala Arg  
 260 265 270  
 Phe Arg Arg Ser Ala Arg Ser Arg Arg Ser Leu Pro Ala Glu Met Pro  
 275 280 285

Leu Ile Pro Val Asn Gln Ala Asp Thr Leu Ile Val Asp Gly Glu Ala  
290 295 300

Val Ser Leu Thr Gly His Ser Gly Asn Ile Phe Ala Pro Glu Gly Asn  
305 310 315 320

Tyr Arg Tyr Leu Thr Tyr Gly Ala Glu Lys Leu Pro Gly Gly Ser Tyr  
325 330 335

Ala Leu Arg Val Gln Gly Glu Pro Ala Lys Gly Glu Met Leu Ala Gly  
340 345 350

Ala Ala Val Tyr Asn Gly Glu Val Leu His Phe His Thr Glu Asn Gly  
355 360 365

Arg Pro Tyr Pro Thr Arg Gly Arg Phe Ala Ala Lys Val Asp Phe Gly  
370 375 380

Ser Lys Ser Val Asp Gly Ile Ile Asp Ser Gly Asp Asp Leu His Met  
385 390 395 400

Gly Thr Gln Lys Phe Lys Ala Ala Ile Asp Gly Asn Gly Phe Lys Gly  
405 410 415

Thr Trp Thr Glu Asn Gly Ser Gly Asp Val Ser Gly Lys Phe Tyr Gly  
420 425 430

Pro Ala Gly Glu Glu Val Ala Gly Lys Tyr Ser Tyr Arg Pro Thr Asp  
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Ala Glu Lys Gly Gly Phe Gly Val Phe Ala Gly Lys Lys Glu Gln Asp  
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<211> 644

<212> PRT

<213> N. meningitidis

<400> 7

Met Ala Ser Pro Asp Val Lys Ser Ala Asp Thr Leu Ser Lys Pro Ala  
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Ala Pro Val Val Ser Glu Lys Glu Thr Glu Ala Lys Glu Asp Ala Pro  
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Gln Ala Gly Ser Gln Gly Gln Gly Ala Pro Ser Ala Gln Gly Gly Gln  
35 40 45

Asp Met Ala Ala Val Ser Glu Glu Asn Thr Gly Asn Gly Gly Ala Ala  
50 55 60

Ala Thr Asp Lys Pro Lys Asn Glu Asp Glu Gly Ala Gln Asn Asp Met  
65 70 75 80

Pro Gln Asn Ala Ala Asp Thr Asp Ser Leu Thr Pro Asn His Thr Pro  
85 90 95

Ala Ser Asn Met Pro Ala Gly Asn Met Glu Asn Gln Ala Pro Asp Ala  
100 105 110

Gly Glu Ser Glu Gln Pro Ala Asn Gln Pro Asp Met Ala Asn Thr Ala  
 115 120 125  
 Asp Gly Met Gln Gly Asp Asp Pro Ser Ala Gly Gly Glu Asn Ala Gly  
 130 135 140  
 Asn Thr Ala Ala Gln Gly Thr Asn Gln Ala Glu Asn Asn Gln Thr Ala  
 145 150 155 160  
 Gly Ser Gln Asn Pro Ala Ser Ser Thr Asn Pro Ser Ala Thr Asn Ser  
 165 170 175  
 Gly Gly Asp Phe Gly Arg Thr Asn Val Gly Asn Ser Val Val Ile Asp  
 180 185 190  
 Gly Pro Ser Gln Asn Ile Thr Leu Thr His Cys Lys Gly Asp Ser Cys  
 195 200 205  
 Ser Gly Asn Asn Phe Leu Asp Glu Glu Val Gln Leu Lys Ser Glu Phe  
 210 215 220  
 Glu Lys Leu Ser Asp Ala Asp Lys Ile Ser Asn Tyr Lys Lys Asp Gly  
 225 230 235 240  
 Lys Asn Asp Gly Lys Asn Asp Lys Phe Val Gly Leu Val Ala Asp Ser  
 245 250 255  
 Val Gln Met Lys Gly Ile Asn Gln Tyr Ile Ile Phe Tyr Lys Pro Lys  
 260 265 270  
 Pro Thr Ser Phe Ala Arg Phe Arg Arg Ser Ala Arg Ser Arg Arg Ser  
 275 280 285  
 Leu Pro Ala Glu Met Pro Leu Ile Pro Val Asn Gln Ala Asp Thr Leu  
 290 295 300  
 Ile Val Asp Gly Glu Ala Val Ser Leu Thr Gly His Ser Gly Asn Ile  
 305 310 315 320  
 Phe Ala Pro Glu Gly Asn Tyr Arg Tyr Leu Thr Tyr Gly Ala Glu Lys  
 325 330 335  
 Leu Pro Gly Gly Ser Tyr Ala Leu Arg Val Gln Gly Glu Pro Ser Lys  
 340 345 350  
 Gly Glu Met Leu Ala Gly Thr Ala Val Tyr Asn Gly Glu Val Leu His  
 355 360 365  
 Phe His Thr Glu Asn Gly Arg Pro Ser Pro Ser Arg Gly Arg Phe Ala  
 370 375 380  
 Ala Lys Val Asp Phe Gly Ser Lys Ser Val Asp Gly Ile Ile Asp Ser  
 385 390 395 400  
 Gly Asp Gly Leu His Met Gly Thr Gln Lys Phe Lys Ala Ala Ile Asp  
 405 410 415  
 Gly Asn Gly Phe Lys Gly Thr Trp Thr Glu Asn Gly Gly Gly Asp Val  
 420 425 430



Ser Gly Lys Phe Tyr Gly Pro Ala Gly Glu Glu Val Ala Gly Lys Tyr  
 435 440 445

Ser Tyr Arg Pro Thr Asp Ala Glu Lys Gly Gly Phe Gly Val Phe Ala  
 450 455 460

Gly Lys Lys Glu Gln Asp Gly Ser Gly Gly Gly Gly Ala Thr Tyr Lys  
 465 470 475 480

Val Asp Glu Tyr His Ala Asn Ala Arg Phe Ala Ile Asp His Phe Asn  
 485 490 495

Thr Ser Thr Asn Val Gly Gly Phe Tyr Gly Leu Thr Gly Ser Val Glu  
 500 505 510

Phe Asp Gln Ala Lys Arg Asp Gly Lys Ile Asp Ile Thr Ile Pro Val  
 515 520 525

Ala Asn Leu Gln Ser Gly Ser Gln His Phe Thr Asp His Leu Lys Ser  
 530 535 540

Ala Asp Ile Phe Asp Ala Ala Gln Tyr Pro Asp Ile Arg Phe Val Ser  
 545 550 555 560

Thr Lys Phe Asn Phe Asn Gly Lys Lys Leu Val Ser Val Asp Gly Asn  
 565 570 575

Leu Thr Met His Gly Lys Thr Ala Pro Val Lys Leu Lys Ala Glu Lys  
 580 585 590

Phe Asn Cys Tyr Gln Ser Pro Met Ala Lys Thr Glu Val Cys Gly Gly  
 595 600 605

Asp Phe Ser Thr Thr Ile Asp Arg Thr Lys Trp Gly Val Asp Tyr Leu  
 610 615 620

Val Asn Val Gly Met Thr Lys Ser Val Arg Ile Asp Ile Gln Ile Glu  
 625 630 635 640

Ala Ala Lys Gln

<210> 8

<211> 434

<212> PRT

<213> N. meningitidis

<400> 8

Met Val Ser Ala Val Ile Gly Ser Ala Ala Val Gly Ala Lys Ser Ala  
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Val Asp Arg Arg Thr Thr Gly Ala Gln Thr Asp Asp Asn Val Met Ala  
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Leu Arg Ile Glu Thr Thr Ala Arg Ser Tyr Leu Arg Gln Asn Asn Gln  
 35 40 45

Thr Lys Gly Tyr Thr Pro Gln Ile Ser Val Val Gly Tyr Asn Arg His  
 50 55 60

Leu 65	Leu	Leu	Leu	Gly 70	Gln	Val	Ala	Thr	Glu	Gly 75	Glu	Lys	Gln	Phe	Val 80
Gly	Gln	Ile	Ala	Arg 85	Ser	Glu	Gln	Ala	Ala 90	Glu	Gly	Val	Tyr	Asn 95	Tyr
Ile	Thr	Val	Ala 100	Ser	Leu	Pro	Arg	Thr 105	Ala	Gly	Asp	Ile	Ala 110	Gly	Asp
Thr	Trp	Asn 115	Thr	Ser	Lys	Val	Arg 120	Ala	Thr	Leu	Leu	Gly 125	Ile	Ser	Pro
Ala	Thr 130	Gln	Ala	Arg	Val	Lys 135	Ile	Val	Thr	Tyr	Gly 140	Asn	Val	Thr	Tyr
Val 145	Met	Gly	Ile	Leu	Thr 150	Pro	Glu	Glu	Gln	Ala 155	Gln	Ile	Thr	Gln	Lys 160
Val	Ser	Thr	Thr	Val 165	Gly	Val	Gln	Lys	Val 170	Ile	Thr	Leu	Tyr	Gln 175	Asn
Tyr	Val	Gln	Arg 180	Gly	Ser	Gly	Gly 185	Gly	Gly	Val	Ala	Ala	Asp 190	Ile	Gly
Ala	Gly	Leu 195	Ala	Asp	Ala	Leu	Thr 200	Ala	Pro	Leu	Asp	His 205	Lys	Asp	Lys
Gly	Leu 210	Gln	Ser	Leu	Thr	Leu 215	Asp	Gln	Ser	Val	Arg 220	Lys	Asn	Glu	Lys
Leu 225	Lys	Leu	Ala	Ala	Gln 230	Gly	Ala	Glu	Lys	Thr 235	Tyr	Gly	Asn	Gly	Asp 240
Ser	Leu	Asn	Thr	Gly 245	Lys	Leu	Lys	Asn	Asp 250	Lys	Val	Ser	Arg	Phe 255	Asp
Phe	Ile	Arg	Gln 260	Ile	Glu	Val	Asp	Gly 265	Gln	Leu	Ile	Thr	Leu 270	Glu	Ser
Gly	Glu	Phe 275	Gln	Val	Tyr	Lys	Gln 280	Ser	His	Ser	Ala	Leu 285	Thr	Ala	Phe
Gln 290	Thr	Glu	Gln	Ile	Gln	Asp 295	Ser	Glu	His	Ser	Gly 300	Lys	Met	Val	Ala
Lys 305	Arg	Gln	Phe	Arg	Ile 310	Gly	Asp	Ile	Ala	Gly 315	Glu	His	Thr	Ser	Phe 320
Asp	Lys	Leu	Pro	Glu 325	Gly	Gly	Arg	Ala	Thr 330	Tyr	Arg	Gly	Thr	Ala 335	Phe
Gly	Ser	Asp	Asp 340	Ala	Gly	Gly	Lys	Leu 345	Thr	Tyr	Thr	Ile	Asp 350	Phe	Ala
Ala	Lys 355	Gln	Gly	Asn	Gly	Lys	Ile 360	Glu	His	Leu	Lys	Ser 365	Pro	Glu	Leu
Asn 370	Val	Asp	Leu	Ala	Ala	Ala	Asp 375	Ile	Lys	Pro	Asp 380	Gly	Lys	Arg	His

Ala Val Ile Ser Gly Ser Val Leu Tyr Asn Gln Ala Glu Lys Gly Ser  
385 390 395 400

Tyr Ser Leu Gly Ile Phe Gly Gly Lys Ala Gln Glu Val Ala Gly Ser  
405 410 415

Ala Glu Val Lys Thr Val Asn Gly Ile Arg His Ile Gly Leu Ala Ala  
420 425 430

Lys Gln

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<212> PRT  
<213> Artificial Sequence

<220>  
<223> Linker sequence

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<211> 255  
<212> PRT  
<213> N. meningitidis

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Ala Asp Ala Leu Thr Ala Pro Leu Asp His Lys Asp Lys Gly Leu Gln  
20 25 30

Ser Leu Thr Leu Asp Gln Ser Val Arg Lys Asn Glu Lys Leu Lys Leu  
35 40 45

Ala Ala Gln Gly Ala Glu Lys Thr Tyr Gly Asn Gly Asp Ser Leu Asn  
50 55 60

Thr Gly Lys Leu Lys Asn Asp Lys Val Ser Arg Phe Asp Phe Ile Arg  
65 70 75 80

Gln Ile Glu Val Asp Gly Gln Leu Ile Thr Leu Glu Ser Gly Glu Phe  
85 90 95

Gln Val Tyr Lys Gln Ser His Ser Ala Leu Thr Ala Phe Gln Thr Glu  
100 105 110

Gln Ile Gln Asp Ser Glu His Ser Gly Lys Met Val Ala Lys Arg Gln  
115 120 125

Phe Arg Ile Gly Asp Ile Ala Gly Glu His Thr Ser Phe Asp Lys Leu  
130 135 140

Pro Glu Gly Gly Arg Ala Thr Tyr Arg Gly Thr Ala Phe Gly Ser Asp  
145 150 155 160

Asp Ala Gly Gly Lys Leu Thr Tyr Thr Ile Asp Phe Ala Ala Lys Gln  
 165 170 175  
 Gly Asn Gly Lys Ile Glu His Leu Lys Ser Pro Glu Leu Asn Val Asp  
 180 185 190  
 Leu Ala Ala Ala Asp Ile Lys Pro Asp Gly Lys Arg His Ala Val Ile  
 195 200 205  
 Ser Gly Ser Val Leu Tyr Asn Gln Ala Glu Lys Gly Ser Tyr Ser Leu  
 210 215 220  
 Gly Ile Phe Gly Gly Lys Ala Gln Glu Val Ala Gly Ser Ala Glu Val  
 225 230 235 240  
 Lys Thr Val Asn Gly Ile Arg His Ile Gly Leu Ala Ala Lys Gln  
 245 250 255

<210> 11  
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 <212> PRT  
 <213> N. meningitidis

<400> 11  
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 20 25 30  
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 35 40 45  
 Ala Ala Gln Gly Ala Glu Lys Thr Tyr Gly Asn Gly Asp Ser Leu Asn  
 50 55 60  
 Thr Gly Lys Leu Lys Asn Asp Lys Val Ser Arg Phe Asp Phe Ile Arg  
 65 70 75 80  
 Gln Ile Glu Val Asp Gly Gln Leu Ile Thr Leu Glu Ser Gly Glu Phe  
 85 90 95  
 Gln Ile Tyr Lys Gln Asp His Ser Ala Val Val Ala Leu Gln Ile Glu  
 100 105 110  
 Lys Ile Asn Asn Pro Asp Lys Ile Asp Ser Leu Ile Asn Gln Arg Ser  
 115 120 125  
 Phe Leu Val Ser Gly Leu Gly Gly Glu His Thr Ala Phe Asn Gln Leu  
 130 135 140  
 Pro Asp Gly Lys Ala Glu Tyr His Gly Lys Ala Phe Ser Ser Asp Asp  
 145 150 155 160  
 Ala Gly Gly Lys Leu Thr Tyr Thr Ile Asp Phe Ala Ala Lys Gln Gly  
 165 170 175  
 His Gly Lys Ile Glu His Leu Lys Thr Pro Glu Gln Asn Val Glu Leu  
 180 185 190

Ala Ala Ala Glu Leu Lys Ala Asp Glu Lys Ser His Ala Val Ile Leu  
195 200 205

Gly Asp Thr Arg Tyr Gly Ser Glu Glu Lys Gly Thr Tyr His Leu Ala  
210 215 220

Leu Phe Gly Asp Arg Ala Gln Glu Ile Ala Gly Ser Ala Thr Val Lys  
225 230 235 240

Ile Gly Glu Lys Val His Glu Ile Gly Ile Ala Gly Lys Gln  
245 250

<210> 12

<211> 262

<212> PRT

<213> N. meningitidis

<400> 12

Cys Ser Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Val Ala Ala Asp  
1 5 10 15

Ile Gly Thr Gly Leu Ala Asp Ala Leu Thr Ala Pro Leu Asp His Lys  
20 25 30

Asp Lys Gly Leu Lys Ser Leu Thr Leu Glu Asp Ser Ile Pro Gln Asn  
35 40 45

Gly Thr Leu Thr Leu Ser Ala Gln Gly Ala Glu Lys Thr Phe Lys Ala  
50 55 60

Gly Asp Lys Asp Asn Ser Leu Asn Thr Gly Lys Leu Lys Asn Asp Lys  
65 70 75 80

Ile Ser Arg Phe Asp Phe Val Gln Lys Ile Glu Val Asp Gly Gln Thr  
85 90 95

Ile Thr Leu Ala Ser Gly Glu Phe Gln Ile Tyr Lys Gln Asn His Ser  
100 105 110

Ala Val Val Ala Leu Gln Ile Glu Lys Ile Asn Asn Pro Asp Lys Thr  
115 120 125

Asp Ser Leu Ile Asn Gln Arg Ser Phe Leu Val Ser Gly Leu Gly Gly  
130 135 140

Glu His Thr Ala Phe Asn Gln Leu Pro Gly Gly Lys Ala Glu Tyr His  
145 150 155 160

Gly Lys Ala Phe Ser Ser Asp Asp Pro Asn Gly Arg Leu His Tyr Ser  
165 170 175

Ile Asp Phe Thr Lys Lys Gln Gly Tyr Gly Arg Ile Glu His Leu Lys  
180 185 190

Thr Leu Glu Gln Asn Val Glu Leu Ala Ala Ala Glu Leu Lys Ala Asp  
195 200 205

Glu Lys Ser His Ala Val Ile Leu Gly Asp Thr Arg Tyr Gly Ser Glu  
210 215 220

Glu Lys Gly Thr Tyr His Leu Ala Leu Phe Gly Asp Arg Ala Gln Glu  
225 230 235 240

Ile Ala Gly Ser Ala Thr Val Lys Ile Gly Glu Lys Val His Glu Ile  
245 250 255

Gly Ile Ala Gly Lys Gln  
260